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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,642	11/13/2001	Stefan M. Freudenberger	10011515-1	6278

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EXAMINER
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SHRADER, LAWRENCE J

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/992,642

Applicant(s)

FREUDENBERGER ET AL.

Examiner

Lawrence Shrader

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11/13/2001; 2/12/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/13/2001</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

1. This Office Action is in response to the application filed on 11/13/2001.

### ***Information Disclosure Statement***

2. The Information Disclosure Statement submitted on 11/13/2001 is acknowledged.

Accordingly, the IDS has been considered by the Examiner.

### ***Oath/Declaration***

3. The declaration filed on 2/12/2002 is acknowledged. However, the Applicant must disclose information material to patentability under 37 C.F.R. 1.56, not a portion of 37 C.F.R. 1.56 (in this case 1.56a). See 37 C.F.R. 1.63, which states the declaration must "state that the person making the oath or declaration acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in § 1.56." A new oath/declaration is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 1; 3, 5 – 9, 11; 18; 26; and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Buzbee, U.S. Patent 6,219,832.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

**In regard to claim 1:**

*“generating annotation information about said computer program;*

*storing said annotation information with said computer program;”*

See Buzbee Figure 1 and column 4, lines 41 - 50.

*“dynamically optimizing said computer program based on said annotation information while said computer program is being executed.”*

See Buzbee column 4, lines 3 – 6.

**In regard to claim 3:**

*“generating annotation information about said computer program;*

*storing said annotation information with said computer program, said annotation information enabling a dynamic optimizer to optimize said computer program during execution.”*

See Buzbee Figure 1; column 4, lines 3 – 6, and column 4, lines 41 – 50.

**In regard to claim 5, incorporating the rejection of claim 3:**

*"...wherein generating annotation information comprises a compiler generating said annotation information."*

See Buzbee, e.g., Figure 1.

**In regard to claim 6, incorporating the rejection of claim 3:**

*"...wherein said computer program comprises at least one executable file."*

Buzbee discloses at least one executable program at column 4, line 6.

**In regard to claim 7, incorporating the rejection of claim 3:**

*"...wherein said computer program comprises least one source file."*

See Buzbee at column 4, lines 41 – 44.

**In regard to claim 8, incorporating the rejection of claim 3:**

*"...wherein said generating annotation information comprises generating annotation information derived from runtime architecture and software conventions."*

See Buzbee column 4, lines 41 – 50 and the Abstract.

**In regard to claim 9, incorporating the rejection of claim 3:**

*"...wherein said computer program is compiled by a compiler, and wherein said generating annotation information comprises generating annotation information derived from information held by said compiler about references to individual memory locations."*

Buzbee discloses compiler adds annotations regarding entry points, which inherently corresponds to a memory location (column 4, lines 41 – 50).

**In regard to claim 11, incorporating the rejection of claim 3:**

*"...wherein said generating annotation information comprises generating annotation information comprising a list of non-ambiguous memory locations."*

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Buzbee discloses compiler adds annotations regarding entry points, which inherently corresponds to a specific memory location (column 4, lines 41 – 50).

**In regard to claim 18:**

*“reading annotation information stored with said computer program;*

*dynamically optimizing said computer program based on said annotation information while said computer program is being executed.”*

See Buzbee Figure 1; column 4, lines 3 – 6, and column 4, lines 41 – 50.

**In regard to claim 26:**

*“one or more computer readable storage media;*

*computer executable instructions stored in the one or more computer readable storage media, the computer executable instructions comprising:*

*instructions for generating annotation information about said computer program, wherein said annotation information enables a dynamic optimizer to optimize said computer program during execution;*

*instructions for storing said annotation information with said computer program.”*

See Buzbee Figures 1 and 3; column 4, lines 3 – 6, and column 4, lines 41 – 50.

**In regard to claim 27:**

*“one or more computer readable storage media;*

*computer executable instructions stored in the one or more computer readable storage media, the computer executable instructions comprising:*

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*instructions for reading annotation information stored with said computer program;*

*instructions for dynamically optimizing said computer program based on said annotation while said computer program is being executed."*

See Buzbee Figures 1 and 3; column 4, lines 3 – 6, and column 4, lines 41 – 50.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 4, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buzbee, U.S. Patent 6,219,832 in view of Porter, U.S. Patent 6,357,040.

**In regard to claim 2, incorporating the rejection of claim 1:**

*"...wherein said dynamically optimizing said computer program comprises replacing subroutine calls in said computer program with inline program code."*

Buzbee discloses a dynamic optimizer, but does not explicitly disclose replacing subroutine calls with inline code. However, Porter discloses an optimizer that replaces a function call with inline code. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the dynamic optimizer of Buzbee with the in-lining

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feature of the optimizer taught by Porter in order to reduce overhead in the optimized code as suggested by Porter at column 5, lines 43 – 46.

**In regard to claim 4**, incorporating the rejection of claim 3:

*“...wherein generating annotation information comprises generating annotation information enabling replacement of subroutine calls with inline program code in said computer program while said computer program is being executed.”*

Buzbee discloses a dynamic optimizer, but does not explicitly disclose replacing subroutine calls with inline code. However, Porter discloses an optimizer that replaces a function call with inline code. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the dynamic optimizer of Buzbee with the in-lining feature of the optimizer taught by Porter in order to reduce overhead in the optimized code as suggested by Porter at column 5, lines 43 – 46.

**In regard to claim 20**, incorporating the rejection of claim 18:

*“...wherein said dynamically optimizing said computer program comprises replacing subroutine calls in said computer program with inline program code.”*

Buzbee discloses a dynamic optimizer, but does not explicitly disclose replacing subroutine calls with inline code. However, Porter discloses an optimizer that replaces a function call with inline code. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the dynamic optimizer of Buzbee with the in-lining feature of the optimizer taught by Porter in order to reduce overhead in the optimized code as suggested by Porter at column 5, lines 43 – 46.



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8. Claims 10, and 12 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buzbee, U.S. Patent 6,219,832 in view of Blaise et al., U.S. Patent 6,505,344 (hereinafter referred to as Blaise).

**In regard to claim 13, incorporating the rejection of claim 11:**

*“...wherein said non-ambiguous memory locations comprise stack frame locations.”*

Buzbee discloses dynamic optimization wherein the annotations are stored that indicate the number of parameters an entry point in the program expected by a handler (column 2, lines 39 – 47), but does not explicitly disclose stack frame location information. However, Blaise discloses inline stack locations as an annotation (column 9, lines 1 – 29). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the dynamic optimization system using annotations as taught by Buzbee with the annotation of a stack frame as taught by Blaise because the annotation provides analysis information to be used during execution as taught by Blaise at column 9, lines 15 – 20.

**In regard to claims 10, 12, and 14 – 17:**

They are rejected for the same reason put forth in the rejection of claim 13. Buzbee discloses dynamic optimization wherein the annotations are stored that indicate the number of parameters an entry point in the program expected by a handler (column 2, lines 39 – 47), but does not explicitly disclose stack frame location information. However, Blaise discloses inline stack locations as an annotation (column 9, lines 1 – 29). Claims 10, 12, and 14 – 17 contain variations of different species of information mapped by the annotations. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the

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dynamic optimization system using annotations as taught by Buzbee with the annotation of a stack frame as taught by Blaise, or an annotation comprising other types of useful functional information, because one would be motivated to use the annotation to provide analysis information used during execution as taught by Blaise at column 9, lines 15 – 20.

In regard to claim 10, incorporating the rejection of claim 3:

*"...wherein said generating annotation information comprises generating annotation information identifying a unique stack pointer register to be used by said computer program."*

In regard to claim 12, incorporating the rejection of claim 11:

*"...wherein said annotation information enables said dynamic optimizer to obtain canonical names for said non-ambiguous memory locations."*

In regard to claim 14, incorporating the rejection of claim 3:

*"...wherein said generating annotation information comprises generating annotation information comprising a mapping of memory references to all non-ambiguous locations which are referenced."*

In regard to claim 15, incorporating the rejection of claim 3:

*"...wherein said generating annotation information comprises generating annotation information comprising a list of canonical names of stack frame locations that are promotable."*

In regard to claim 16, incorporating the rejection of claim 3:

*"...wherein said generating annotation information comprises generating annotation information comprising a guarantee that no stack frame location is live beyond the scope of the stack frame."*

In regard to claim 17, incorporating the rejection of claim 3:

*"...wherein said generating annotation information comprises generating annotation information comprising a format and a location of stack unwinding information."*

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buzbee, U.S. Patent 6,219,832 in view of Bugnion, U.S. Patent 6,704,925.

**In regard to claim 19**, incorporating the rejection of claim 18:

*"...wherein said dynamically optimizing said computer program comprises a binary translator optimizing said computer program."*

Buzbee discloses a dynamic translating system optimizer (see Abstract), but does not explicitly disclose a binary translator. However, Bugnion discloses a binary translator. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the dynamic optimizer of Buzbee with the binary translator taught by Bugnion because binary translation is more efficient by eliminating overhead in software interpretation as taught by Bugnion at column 2, lines 42 – 43.

10. Claims 21 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buzbee, U.S. Patent 6,219,832 in view of Ng, U.S. Patent 6,704,314.

**In regard to claim 21**, incorporating the rejection of claim 18:

*"...wherein said dynamically optimizing said computer program comprises removing redundant callee-save register restores."*

Buzbee discloses dynamic optimization (column 2, lines 39 – 47), but does not explicitly disclose removing redundant callee-save register stores. However, Ng discloses optimization to remove redundant expressions (column 1, lines 40 – 65). It is well known in the art that the purpose of optimization is to analyze code and produce more efficient instruction sequences to increase performance. Therefore, it would have been obvious to one skilled in the art at the time

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the invention was made to combine the dynamic optimization system as taught by Buzbee with the removal of redundant expressions as taught by Ng because the analysis information and restructuring of instructions improves performance.

**In regard to claims 22 – 25:**

They are rejected for the same reason put forth in the rejection of claim 21. Buzbee discloses dynamic optimization (column 2, lines 39 – 47), but does not explicitly disclose removing redundant callee-save register stores. However, Ng discloses optimization to remove redundant expressions (column 1, lines 40 – 65). It is well known in the art that the purpose of optimization is to analyze code and produce more efficient instruction sequences to increase performance. Claims 10, 12, and 14 – 17 contain variations of different species of information obtained by analysis and adjusting the code to improve performance. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the dynamic optimization system as taught by Buzbee with the removal of redundant expressions as taught by Ng because the analysis information and restructuring of instructions improves performance.

In regard to claim 22, incorporating the rejection of claim 18:

*“...wherein dynamically optimizing said computer program comprises propagating constant arguments within said computer program.”*

In regard to claim 23, incorporating the rejection of claim 18:

*“...wherein said dynamically optimizing said computer program comprises promoting local data from a stack frame location to a register.”*

In regard to claim 24, incorporating the rejection of claim 18:

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*"...wherein said dynamically optimizing said computer program comprises removing redundant callee register saves."*

In regard to claim 25, incorporating the rejection of claim 18:

*"...wherein said dynamically optimizing said computer program comprises removing stack frame allocation."*

### **Conclusion**

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Shrader whose telephone number is (571) 272-3734.

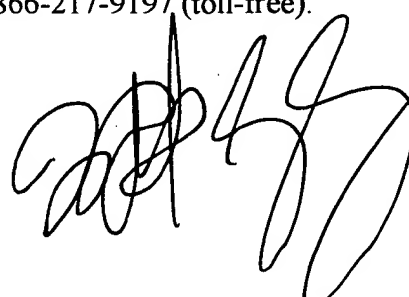
The examiner can normally be reached on M-F 08:00-16:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (571) 272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence Shrader  
Examiner  
Art Unit 2124

1 December 2004



**TODD INGBERG**  
**PRIMARY EXAMINER**